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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/803,404	03/09/2001	Takahiro Fukuhara	450100-03057	8710

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EXAMINER

CHEN, WENPENG

ART UNIT PAPER NUMBER

2624

DATE MAILED: 04/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/803,404

Applicant(s)

FUKUHARA ET AL.

Examiner

Wenpeng Chen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 March 2005 and 01 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-9,11-13,24 and 25 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,11-13,24 and 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/4/2005 has been entered.

Examiner's responses to Applicant's remark

2. Applicant's amendments filed on 2/1/2005 overcome the rejections to Claims 1-13 and 24-25 under 35 U.S.C. 112, first paragraph set forth in Office Action mailed on 12/6/2004.

3. Applicant's arguments filed on 2/1/2005 with respect to all the pending claims have been considered but are moot due to the amendments.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-2, 4-9, 11-13, and 24-25 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for the following reasons.

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There are insufficient antecedent bases for the following limitations.

- Claim 1 recites the limitation "said quantization coefficients" in line 12.
- Claim 7 recites the limitation "said quantization coefficients" in line 15.
- Claim 24 recites the limitation "said quantization coefficients" in line 12.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The interpreted Claims 1-2, 5-6, and 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791 cited previously) in view of Nixon (US patent 6,201,897.)

For Claims 1-2 and 5-6, Ogata teaches a picture encoding apparatus comprising:

-- memory means for writing and storing an input picture; (In Fig. 6, the input data are read and processed with LPF and HPF. The filtering processes inherently require memory for the recited purpose.)

-- wavelet transform means for applying wavelet transform in the horizontal and vertical directions, thereby generating wavelet transform coefficients for a plurality of sub-bands; (Fig.

6)

-- quantization means for quantizing wavelet transform coefficients for each sub-bands obtained from said wavelet transform means; (56a-56g of Fig. 6)

-- entropy encoding means for entropy encoding quantized coefficients from said quantization means; (encoder 57 of Fig. 6; column 6, lines 54-61; column 10, lines 50-61; column 12, lines 25-38)

-- quantization means quantizing the wavelet transform coefficients, *using weighting coefficients of a table for each sub-band generated at the time of wavelet transform*; (column 6, lines 41-53; column 10, lines 50-61; column 12, lines 25-38; Each quantization step of 56a-56g in Fig. 6 quantizes every coefficients in a sub-band. *The Applicants considered that the T's, such TLH, assigned to the sub-bands in their Fig. 6 to be a table of weighting coefficients. Therefore, Ogata's collection of the quantization steps is also a table, because in a memory the quantization steps are stored in one-to-one correspondence with the sub-bands. Please note that the table is for sub-bands, not for blocks. The quantization steps are available at the time of wavelet transform.*)

-- wherein weighting coefficients of said table of said quantization means for each sub-band are such that, the larger the number of sub-band splitting stages, the larger become the weighting coefficients and the higher becomes the priority placed on the weighting coefficients, and conversely, the smaller the number of the splitting stages, the smaller become the weighting coefficients and the lower becomes the priority placed on the weighting coefficients, and such that, in sub-bands of the same splitting stage, the weighting coefficients become smaller for the high range than for the low range to decrease the priority of the weighting coefficients; (column 6, lines 41-53; column 10, lines 50-61; column 12, lines 25-38)

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-- wherein said input picture is a continuous picture of a plurality of frames and wherein the input continuous picture is sequentially encoded from one frame to another. (column 1, lines 12-18; Video signals are processed.)

However, Ogata does not teach the features related to the line-by-line wavelet process of Claim 1.

Nixon teaches a picture encoding apparatus with wavelet compression tile-by-tile comprising:

-- memory means for writing and storing an input picture from one line to another; (Fig. 3A; column 8, lines 44-68)

-- wavelet transform means for applying wavelet transform in the horizontal and vertical directions each time a picture stored in said memory means reaches the number of lines required for wavelet transform; (Fig. 3A; column 8, line 59 to column 9, line 65)

-- quantization means for quantizing wavelet transform coefficients for each sub-bands obtained from said wavelet transform means; (column 9, lines 41-64; column 14, lines 1-10)

-- encoding means for encoding quantized coefficients for each sub-band from the quantization means in units of block area when the number of samples of said quantized coefficients has reached the size of a block area required for encoding; (column 9, lines 41-64; column 14, lines 1-10; A block area is an area of a dimension of (number of lines) x (line width).)

-- wherein said input picture is split into a plurality of rectangular tiles and written in said memory means. (The image is inputs in units of lines as shown in column 12, lines 54-60. Such an input scheme automatically split the image into rectangular tiles of a dimension of (number of lines) x (line width).)

It is desirable to process very large digital images in a system with limited amount of working memory. It would have been obvious to one of ordinary skill in the art, at the time of the invention, to apply Nixon's teaching to decompose Ogata's images into wavelet sub-bands in an image-tile version of a dimension of (number of lines) x (line width) with a line-based wavelet transform, then quantize the resulted wavelet coefficients with Ogata's approach, and entropy encode the quantized coefficients in each sub-band when the number of the number of samples of said quantized coefficients has reached the size of a block area, because the combination provides wavelet compression of very large images in a system with limited amount of working memory.

The above-cited passages also teach the corresponding method of Claims 24-25.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (US patent 5,926,791) in view of Nixon (US patent 6,201,897) as discussed above, and further in view of Keith et al. (US patent 5,881,176 cited previously.)

The combination of Ogata and Nixon teaches the parental Claim 1. However, it does not teach the feature related to bit planes recited in Claim 4.

Keith teaches coding with (1) tree for a set of lines associated with block area with each sub-bands (Fig. 31C; column 50, line 1-7) and (2) entropy encoder with bit plane, comprising:

-- wherein said entropy encoding means resolve quantization coefficients in said block into bit planes composed of binary data and executes arithmetic encoding depending on the occurrence probability distribution of symbols in each bit plane, and wherein the estimation of said probability distribution is performed only on data in a predetermined block. (Figs. 12, 14)

It is desirable to facilitate selecting parts of compressed data based onto structure, such as the frequency band and importance level for various users. It would have been obvious to one of

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ordinary skill in the art, at the time of the invention, to apply Keith's bit plane encoding approach to encode the quantized wavelet coefficients generated in the system taught by the combination of Ogata and Nixon, because the overall combination provides flexibility of the compressed data for various users.

Allowable Subject Matter

9. Claims 7-9 and 11-13 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.

The following is a statement of reasons for the indication of allowable subject matter. The prior art fails to teach the apparatus of Claim 7 which specifically comprises the following features in combination with other recited limitation:

-- quantization means for quantizing wavelet transform coefficients for each sub-band obtained from said wavelet transform means;

-- block picture analysis means for *analyzing the motion information in a block picture and the degree of fineness of the texture for each block area* in said input picture

-- encoding means for *encoding said quantized coefficients for each sub-band* from the quantization means *in units of block area when the number of samples* of said quantized coefficients has *reached the size of a block area required for encoding*;

-- quantization means quantizing the wavelet transform coefficients, *using weighting coefficients of a table for each sub-band generated at the time of wavelet transform.*

Nixon's block area used in line-based wavelet transform is not used for analysis of motion of texture. None other prior teaches encoding quantized coefficients for each sub-band in

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units of block area when the number of samples has reached the size of a block area required for encoding in a line-based wavelet transform.

None of the references cited currently or previously can be combined to teach Claim 7.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wenpeng Chen whose telephone number is 571-272-7431. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 571-272-7437. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications. TC 2600's customer service number is 571-272-2600.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2600.

Wenpeng Chen
Primary Examiner
Art Unit 2624

April 19, 2005

